Experts call for modernized airline maintenance

By Alan Levin, USA TODAY

Minutes after AirTran Airways Flight 913 left Greensboro, N.C., nearly four years ago, sparks flew from a wall that separates the cockpit from the cabin.

Emergency personnel work Jan. 8, 2003, at the scene of a plane crash in Charlotte that killed 21 people.

By Bob Jordan, AP

A part inside the wall of the DC-9 aircraft had been repaired years before by mechanics halfway around the world — even though the manufacturer required that it be replaced, not repaired.

Because it hadn't been replaced, a fire blazed inside the wall and noxious fumes filled the cockpit. When a flight attendant opened the cockpit door, she saw the pilots wearing oxygen masks and goggles. As smoke seeped into the cabin, passengers witnessed first-hand what happens when a mistake is made maintaining a jet.

USA TODAY evaluated the 158 most severe domestic airline crashes on commercial planes with 15 or more seats from 1980 through 2001. The list includes accidents involving similar-sized cargo planes.

The causes of the accidents were based on findings by the National Transportation Safety Board. It has yet to determine the causes of four of the five domestic airline accidents since 2001.

No one died on that flight on Aug. 8, 2000. But the pilots told investigators later that there were moments when they doubted they'd make it back to the airport. The jet eventually made an emergency landing. (**Related:** Accidents caused by maintenance)

The fire was one of 11 serious accidents caused by maintenance problems at airlines from 1995 through 2001, a USA TODAY analysis shows. In each case, the accident was serious enough to kill people or cause damage in excess of the plane's value.

Maintenance accidents continue to occur. Last week, federal investigators cited poor maintenance as a cause of a Beech 1900D commuter plane crash on Jan. 8, 2003, in Charlotte that killed 21 people. Maintenance also is under investigation in the crash Aug. 26 of Colgan Air Beech 1900D in the water off Yarmouth, Mass., that killed two pilots, the only people aboard.

The accidents are triggering careful scrutiny. Crash investigators issued tough recommendations last week to upgrade maintenance and enforcement.

Regulators acknowledge they need to do more. But past efforts have been opposed by the airline industry, which says improvements are too costly.

At the same time, airlines face the most severe economic downturn in aviation history. To save money, they are shifting more maintenance work to outside contractors.

That trend is raising other safety concerns. Maintenance experts say it can be more difficult for airlines to ensure quality when they no longer maintain planes themselves. And government watchdog groups say federal regulators aren't adequately inspecting outside contractors.

Federal accident investigators with the National Transportation Safety Board say they've seen nothing to indicate a growing problem with maintenance.

But as the overall rate of accidents has fallen in this country, the rate of accidents caused by maintenance has remained about the same. As a result, poor maintenance is now the second most likely cause of crashes — about 30% from 1995 to 2001 — supplanting other causes such as weather and mechanical failure.

The federal government doesn't mandate regular training of airline maintenance workers once they have qualified for a federal license. Here's what the government says:

"Each certificate holder or person performing maintenance or preventive maintenance functions for it shall have a training program to ensure that each person (including inspection personnel) who determines the adequacy of work done is fully informed about procedures and techniques and new equipment in use and is competent to perform his duties."

— Federal Aviation Regulation Part 121.375

In recent accidents, a variety of screw-ups — from undiscovered cracks in engines to the failure to lubricate a key part for years — were to blame. The accidents struck large airlines such as Delta and Alaska, and smaller carriers such as Atlantic Southeast.

Failed efforts

Improvements in cockpit technology and pilot training have caused a dramatic decline in crashes caused by pilots.

But far less has been done to modernize maintenance.

The regulation governing ongoing training for mechanics at large airlines contains 52 words. It only requires that each mechanic be "fully informed" and "competent to perform his duties."

Pilots must undergo training exercises each year. Yet there is no specific requirement for training after a mechanic receives a federal license. Mechanics take courses or serve an apprenticeship for about two years and must pass several tests before being licensed.

After almost a decade of discussion, the Federal Aviation Administration tried in 1998 to introduce a new rule for maintenance training. But the proposal was withdrawn after the industry protested. The FAA has issued guidelines for how airlines can voluntarily improve maintenance, and the leading aviation safety advocacy group says it is studying ways to reduce the number of crashes caused by maintenance. But no large-scale changes are being proposed.

"We've been just twiddling our thumbs about what to do with mechanics for the past several years," says Brian Finnegan, president of the Professional Aviation Maintenance Association, which represents more than 3,000 mechanics. Finnegan's group supports higher standards and additional requirements for training.

According to interviews with airline officials, maintenance workers, researchers and regulators:

• The United States has fallen behind Europe in requirements for maintenance training. Prompted by several accidents caused by poor maintenance, European regulators starting this year will require all mechanics to take a recurring course to help them reduce errors. U.S. carriers say they prefer having the flexibility to devise their own training.

• Over the past decade, almost every major carrier began a program to reduce maintenance errors through better training and new procedures. But in most cases, the programs ended within a few years. The airlines either lost interest or couldn't afford the programs, says Jim Taylor, a maintenance researcher at NASA's Ames Research Center.

"Then the program goes away, and the benefits go away," he says. "We've seen that over and over again."

The Air Transport Association, the Washington lobbying arm of airlines, says flying continues to get safer and airlines have taken steps to improve maintenance. The ATA says more than half of its members have some type of training program to help reduce maintenance errors.

Some airline and government officials acknowledge that programs that have helped reduce errors by pilots — such as extensive, ongoing training and efforts to produce technology that improves safety — have not been applied to maintenance workers.

"Have we concentrated as much on mechanics as on pilots? I think the evidence suggests not," says Nick Sabatini, the FAA's chief of regulation. "But we are planning to do that."

FAA Administrator Marion Blakey says the agency needs to focus on maintenance in order to continue improving safety.

Outside contracting

Every commercial plane receives extensive maintenance. Government-approved schedules require periodic checks or replacement of mechanical parts. Pilots can trigger checks if parts malfunction. The simplest tasks, such as changing tires, are performed between flights. More time-consuming work is usually done overnight. Every few years, jets receive massive overhauls that can ground them for weeks.

Small and low-cost airlines have traditionally sent much of their maintenance work to outside contractors. Large carriers, stung by huge financial losses in recent years, have increasingly begun to do so as well. Delta Air Lines, for example, spent about $100 million in maintenance at outside contractors in 1996. That rose to more than $300 million in 2002, according to Department of Transportation data.

Major airlines spent 47% of their maintenance budgets on outside contractors in 2002, the government says. That's up from 37% in 1996.

These arrangements have raised new questions about safety.

For years, some airlines, such as Southwest, have sent large portions of their maintenance to outside firms and received high marks for safety. But Barbara Kanki, a NASA maintenance researcher, says bringing an outside organization in to do maintenance adds complications that can make errors more likely.

Outside maintenance has also been more difficult for the government to oversee. The DOT inspector general's office said in a report in July that the FAA had not added inspectors to oversee the increase in work at maintenance facilities run by contractors. More than 1,700 inspectors have at least some responsibility for overseeing airline maintenance. The FAA also relies on some countries to inspect foreign shops certified to perform repairs on U.S. airline jets.

The FAA sought permission last year to add 20 positions to its inspector division, but funding was cut by Congress.

Sarah MacLeod, executive director of the Aeronautical Repair Station Association, says repair work done by the outside firms her association represents is equal to the quality at airlines. But she says it's time to apply the techniques that improved safety among pilots.

"The obvious next step (to improve safety) is going to be the mechanics," she says. "Are we supposed to ignore that? Hell, no. We've got to focus on that."

John Goglia, a member of the NTSB and a former airline mechanic, says he's worried.

"We're essentially doing business the same way we did it 40 years ago," he says.

Flight 913's close call

The smoke swirling around the pilots aboard AirTran Flight 913 grew so thick that Capt. Michael Watson could not see co-pilot Samuel Hooper. Watson could not even read the cockpit gauges, he told investigators.

Finally, after an air-traffic controller directed them back toward Greensboro's longest runway, they saw the airport. Almost 10 minutes after the fire began, they landed safely as the fire continued burning.

NTSB investigators traced the fire to an electrical component. They discovered it had been repaired when it should have been replaced.

The repair had apparently been done in 1978 when the jet was owned by Turkish Airlines. It was sold later to AirTran.

An inspection of other AirTran DC-9s revealed that several had received similar repairs on the same part. Investigators also found improper repairs at most other airlines flying DC-9s, regardless of whether the jets had been owned by foreign carriers.

The FAA issued a notice to airlines reminding them that repairs on the parts were not permitted. No further problems have been reported.

To Goglia, the case illustrates why changes are needed.

"On airplanes, there is no such thing as an insignificant task," he says. "When things go bad, there's no way to pull over to the side of the road. Every task must be treated as if your life depended on it."